Claims 1, and 4-6 were rejected as being obvious based on the disclosure/teaching of Acker in view of Gebhardt et al, which rejection applicants believe is not soundly based.

Claim 1 of the present application (as well as dependent claims 2-7) is specifically directed to a keep-warm system for a fuel cell power plant. The Background description explores the problems associated with fuel cells in the event they freeze and need to be restarted. Assuming no damage is done to the fuel cell or other temperature-critical components of the power plant in the event of a freeze, there nevertheless remains the problem of attempting to rapidly restart the fuel cell from the frozen condition. It may not be possible to achieve the requisite thawing in the several seconds allowed for a restart, and efforts to accelerate the process by "brute" force typically require a greater source of electric power or other energy than is possible or at least commercially practical. To overcome that problem, applicants have developed a practical, economical, and effective arrangement for keeping the fuel cell stack assembly (CSA) and other freeze-sensitive portions of a fuel cell power plant sufficiently warm for extended periods to minimize or effectively prevent, freeze-up and the need for thawing. This is accomplished by the assembly of elements or components, recited in a – f of claim 1. Briefly and simply stated, there is provided a CSA, a fuel supply, a source of oxidant reactant, a water management system, and importantly, a thermal insulating enclosure for one or more of the CSA and the water management system, and a catalytic burner. The burner catalytically reacts fuel and oxidant to provide heat, and is disposed such that the heat is provided into the thermal insulating enclosure. The dependent claims 2-7 recite the character of the catalytic burner, the combustion reaction process and temperature, the use of air and pressurized hydrogen as the reactants for the burner, and that both the CSA, which is a PEM, and the water management system are within the thermal insulating enclosure. This arrangement affords a fuel and energy-efficient means for keeping the critical elements from freezing for long intervals of 7 days or more under external freezing conditions.

Applicants respectfully submit that the references applied by the Examiner simply do not describe or in any way teach the combination of elements recited in applicants' Claim 1, and even less so the combination of elements in the claims depending therefrom.

While the Acker reference does disclose several of the recited components of applicants' claimed system, it does not disclose the catalytic burner, as the Examiner acknowledges. More importantly, contrary to the position taken be the Examiner, it does not disclose or in any way teach "thermal insulating means enclosing at least one of the CSA and the water management system for providing thermal insulation thereof". The Examiner states that, with respect to the Acker reference, "the casing of the fuel system (14) in Figure 2 is considered as a thermal insulating means which encloses the fuel cell stack and the cooling subsystem". Clearly this interpretation exceeds the bounds of what is required of a reference in a 103 "obviousness" rejection.

The Acker reference is concerned with a fuel cell system that is specially adapted to provide enhanced air purification for stationary and mobile applications. Nowhere in the description of the Acker system, including the several Figures associated therewith, is there any mention or even a suggestion of a thermal insulating means. Although the Examiner states that the casing in Fig 2 is, or at least suggests, such a thermal insulating means, Applicants fail to find any such meaning or teaching. The so-called "casing" (14) of Fig. 2 of Acker is simply a 3-dimensional block diagram said to actually be the "fuel cell system", which includes the fuel cell stack 50. There is simply no teaching that a thermal insulating enclosure is, could, or should be present in the arrangement of Acker, and it certainly does not teach the inclusion of a thermal insulating means as an enclosure for freeze-sensitive components of a fuel cell power plant system. It is respectfully submitted that any such construction of the Acker reference can only arise, if at all, as the result of hindsight provided by applicants' disclosure and teaching, and certainly not from any such teaching in Acker.

The deficiencies of the Acker reference are sufficient in and of themselves to obviate the basis for an obvious rejection of the main claim and the claims depending therefrom. However, it is further noteworthy that the Gebhardt et al reference does not teach a keep-warm system as presently claimed. Rather, Gebhardt et al teaches a cold-starting method and arrangement that supplies reaction gas to a burner "during starting". Moreover, that burner is comprised of catalyst surfaces in the fuel cell stack and presumably supplies heat only to the stack. No mention is made of an insulating enclosure.

The Tomomura reference, used as a further reference to reject Claim 7, is for the production of argon by catalytically burning certain waste gases that include hydrogen. The burning occurs not for the purpose of generating heat, but rather to remove gases such as hydrogen. Moreover, although the Office Action states that the Tomomura reference uses platinum as the catalyst, a review of that reference reveals only the mention of palladium (Pd), and not platinum (Pt).

For the foregoing reasons, the references, and particularly the Acker reference, are seen to be deficient in any purported teaching of the obviousness of the claimed invention. Accordingly, applicants respectfully submit that Claim 1, and the remaining claims depending therefrom, patentably distinguish over any reasonable teaching by the cited references, and favorable reconsideration and an indication of allowance of all of the claims is respectfully solicited. If any issue(s) remains, or arises, that might be resolved by telephone, it is respectfully requested that Applicant's attorney be contacted at telephone: (860) 313-4402.

Respectfully submitted,

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Marked copy of Abstract

Abstract

A keep-warm system for a fuel cell power plant **(10)**, typically of the [proton exchange membrane (]PEM[)] type[.], [The keep-warm system] prevents freeze-sensitive portions of the power plant, such as the cell stack assembly (CSA) **(12)** and the water management system **(28, 30)**, from freezing under extreme cold external temperatures, during extended storage (CSA shut-down) periods [of 7 days or more. The system uses p]Pre-stored and pressurized fuel, typically hydrogen **(25)**, normally used to fuel the anode **(16)** of the CSA, **is used** as fuel for a catalytic oxidation reaction at a catalytic burner **(66)**[. The hydrogen or other suitable fuel, is catalytically reacted with an oxidant, such as air **(22)**,] to produce heated gas that convectively passes in heat exchange relation with the freeze sensitive portions **(12, 28, 30)** of the power plant **(10)**. [The heat of the reacted hydrogen and air, typically 200^0-700^0 F, distributes that heated gas to the required portions of the power plant **(10)** and establishes t]The convective flow [that] **of the heated gases** induces the air flow to the burner **(66)**[.], [That convective flow] obviat[es]**ing** the need for parasitic electrical loads [such as pumps and blowers. One or more **t**]Thermal insulating means **(64)** substantially enclose the freeze-sensitive CSA **(12)** and/or the water management system **(28, 30)**, [as well as] and the convective flow of the heated gas from the catalytic burner **(66)**, to improve system thermal efficiency.